Advantages of Electrosurgical Technic

1. General applicability and flexibility. Delicate dissections possible.
2. Hemostasis and asepsis. Infected cauliflower ulcerated growths may be resected with less danger of implantation in the wound.
3. The almost total absence of postoperative discomfort and shock.
4. The method of choice for recurrent cancer, "radium fast" and radioresistant cancer.
5. Wound healing is satisfactory if the growth has been completely removed. Failure to heal indicates follow up biopsy. Skin grafting and plastic repair are only occasionally required.

CONCLUSIONS

1. Electrosurgical excisional biopsy is recommended as a simple, safe and satisfactory technic for the resection of readily accessible neoplasms.
2. The method is based upon the cardinal principles of biopsy diagnosis and complete extirpation of the growth.
3. Determination of the type, grade and extent of the growth enables the oncologist to decide whether postoperative radiation is indicated.
4. Although the method is not infallible, in the comparatively few cases of apparently localized lesions which have extended beyond the margin of excision, further operation or radiation is usually effective.
5. Five year cures have followed the method in more than ninety-five percent of cases which were accepted for treatment in office and outpatient clinic during the past fifteen years.

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ELECTROSURGICAL EXCISIONAL BIOPSY*

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Early recognition, accurate histologic diagnosis and prompt eradication are cardinal principles in the control of cancer. The general public has become "cancer conscious." The general physician is often consulted for advice as to the correct management of the "chronic ulcer, the scaly bleeding wart, the irritated blue black mole and the lump which has changed in size and shape."[1]

The prophylactic removal of "precancerous" lesions has been well established. Routine biopsy upon such neoplasms often shows that they have already undergone malignant change. The profession, then, should have more than casual interest in a simple, safe and satisfactory method of management for readily accessible new growths suspected of being cancer.

Electrosurgical excisional biopsy is a technic which has been evolved in my own experience in the eradication of more than five thousand neoplasms during the past fifteen years. The preliminary report was published eleven years ago.[2] The fundamental principles of both electrosurgery and surgical pathology are well known to the

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[1] "Ten Golden Rules of the Cancer Examination." *Bull. Am. Soc. for the Control of Cancer*—Vol. 19, No. 7, July, 1937.

[2] Physical Agencies in Superficial Malignancy. E. N. Kime. *Indianapolis Med. Jour.* Vol. 323, May, 1927.

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profession.[3] Electrosurgery has become established as a valuable adjunct in general surgery, gynecology, genitourinary and neurological surgery.[4] I have found it of great value in the management of deep seated cancer in the head and neck.[5] Electrosurgery and radiation are often effective in the palliative treatment and occasional cure of otherwise inoperable cancer.[6]

Electrosurgical excisional biopsy is recommended to the profession because of its flexibility of application in the management of a wide variety of readily accessible new growths. The method is simple, safe, and satisfactory to both physician and patient. It is well adapted to use in the office and outpatient clinic, as well as in the hospital. Electrosurgical excisional biopsy is based upon the cardinal principles of modern oncologic science: (1) microscopic diagnosis in every neoplasm, and (2) complete ablation of the growth by excision through perijacent normal tissue and subjacent tumor bed. Careful study of the gross and microscopic structure of the growth is routinely done. Since the wound is permitted to heal by granulation in most cases, further biopsy, electrosurgery or irradiation may be done when indicated. In the great majority of early readily accessible neoplasms, however, electrosurgical excisional biopsy used as the first step in the management of the lesion does not require any further attention except routine dressings of the wound.

ADVANTAGES OF ELECTROSURGICAL EXCISIONAL BIOPSY

1. *Simplicity.*

The method is applicable in office and outpatient clinic. In most cases the growth is removed under local anesthesia without pain, hemorrhage or shock. There is almost no after discomfort and the patient suffers a minimum of inconvenience and expense. In those patients with extensive lesions, but with accessible neoplastic tissue, electrosurgical biopsy at the outset permits histologic diagnosis with more accurate appraisal of type, grade, and probable extent of the growth. This information is of great value in planning the management—with especial reference to preoperative and postoperative radiation.

2. *Safety.*

Electrosurgical excisional biopsy is a safe technic when properly performed. The hazards of cancer surgery, implantation of the growth and infection through the wound are overcome by the very nature of the technic employed. In the occasional case, in which the operator must cut through a malignant extension of the primary growth, cancer is not spread through open lymphatic spaces as would be expected after operation with the ordinary scalpel. It is only fair to state, however, that more than ordinary skill and judgment are required in electrosurgery. Heavy thermodestructive currents and high voltage "fulguration" may lead to unnecessary destruction of blood vessels, nerves, ducts or periosteum. High voltage fulguration, as employed in archaic diathermic devices, is not only ineffective in that it produces only surface destruction of the growth, but may also force living cancer more widely into the tumor bed. The electrocautery, and other forms of actual cautery may be effective in the destruction of accessible growths, but are not so effective and flexible as the technic of electrosurgical excisional biopsy. In electrosurgical excision the growth is excised through a safe line of cleavage by means of a fine dividing arc, under visual guidance of the operator. Delicate dissections along important anatomic structures, nerves, blood vessels, ducts and periosteum may be skillfully, accurately and safely performed by employing the modern electrosurgical unit.

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[3] Electrosurgery. E. N. Kime, *Jour. Ind. State Med. Assn.* Vol. 21, p. 480, Nov., 1928. Electrosurgery as an Aid to the Removal of Intracranial Tumors. Harvey Cushing. *Surg. Gyn. Obst.* Vol. 47, p. 751, Dec. 1928.

[4] Electrosurgery. E. N. Kime. *New England Jour. Med.* Vol. 200, p. 532. March, 1929.

[5] Electrosurgery of Cancer of Nasal Accessory Sinuses. E. N. Kime. *Arch. Phys. Therapy, X-ray and Radium.* Vol. XIX, pp. 155-157. March, 1938.

[6] Prognosis in Cancer. E. N. Kime. *Arch. Phys. Therapy, X-ray and Radium.* Vol. XVI, pp. 282-284. May, 1935.

3. *Satisfaction based upon five year end results.*

a. From the viewpoint of the patient, electrosurgical excisional biopsy, when employed for the eradication of early, low grade, localized readily accessible neoplasms, interferes but little with the daily life and activities of the patient. The minimum of discomfort, inconvenience, and expense—and the maximum of satisfaction based upon cure and cosmetic end results are the general rule after this method.

b. From the viewpoint of the physician. It is a source of great satisfaction to the attending physician to be able accurately to diagnose the

neoplasm, and also to be able to determine precisely whether the growth has been completely removed. It is also of great importance to evaluate the grade of malignancy and radiosensitivity, thereby controlling the postoperative radiation when indicated. Electrosurgical excisional biopsy has proven effective in the extirpation of localized cancer which had become either "radium fast" or radio-resistant to x-ray. In three hundred odd cases of low grade cancer of the head and neck, five to ten-year cures have followed electrosurgical excisional biopsy in approximately ninety-eight percent.

A brief discussion of the lesions which have been found amenable to cure by electrosurgical excisional biopsy is apropos.

Benign Neoplasms

These new growths are very common. Comparatively few require treatment. Common sense clinical judgment should indicate those lesions which are a potential source of danger. Many of these benign neoplasms are adult cell in type and radioresistant. Electrosurgical excisional biopsy is effective for all types of benign neoplasms. Pigmented nevi, pedunculated nevi, papillomata, keratoses, mucous cysts, polyps, and xanthelasma, among others, may be removed completely with resultant scarcely visible scar. It should be emphasized, moreover, that any neoplasm considered important enough to have any form of surgery should be removed completely. Sometimes, because of cosmetic considerations, the operator may be tempted to "take off" the growth, or to "burn it off" with cautery, caustics or fulgurating electric spark. These methods, as compared with the delicately flexible technic of electrosurgical excision, are less scientific, less effective, and more likely to leave unsightly scars. Of much greater danger to the patient is the likelihood of activating a nevus (even a non-pigmented mole) into highly malignant melanoma. This catastrophe has been reported following "fulguration." The risk is much less, in fact negligible, with properly performed electrosurgical excisional biopsy.

Precancerous Lesions—Curable by Electrosurgical Excisional Biopsy

1. Irritated blue black moles. (Forerunners of melanocarcinoma.)

2. Papillomata, senile keratoses, and leukoplakia. Senile verruca on the face, lip, and dorsum of the hand. Cutaneous horns. Scaly fissured keratoses on exposed surfaces. Cicatrices following old burns. Keratotic and telangiectatic radiodermatoses and areas of radionecrosis following radium or x-ray burns. All these lesions are forerunners of squamous celled cancer, or epidermoid carcinoma and electrosurgical excisional biopsy is so effective that it may be used as the method of choice.

3. Oil Gland Tumors and Cysts. Seborrheic keratoses, sebaceous adenoma, and sebaceous cysts, (forerunners of adnexal type cancer or basal celled carcinoma). Routine biopsy of common wen (sebaceous cyst) shows incidence of cancer in approximately ten percent.

4. "Precancerous" epulis (giant celled sarcoma of the gum), Bowens' intra-epidermal epithelioma, and Paget's epidermoid tumour of the nipple are not *precancerous* growths. They are *malignant* neoplasms.

5. Cervical erosion, cervical polyp, urethral caruncle, cysts of the female external genitals, inclusion and dermoid cysts, sweat gland adenoma, glomus tumors, hemolymphangiomata and endothelioma are all amenable to cure by electrosurgical excisional biopsy.

Malignant New Growths—Amenable to Electrosurgical Excisional Biopsy

1. *Basal cell Carcinoma.* (Carcinoma basocellulare. Rodent Ulcer.)

This is the most common type of human cancer. If promptly attacked it may be readily cured by electrosurgical excisional biopsy. It may also be cured when in its early superficial stage by various destructive agents. X-ray and radium are effective, so effective in fact that the claim has been made that they are the agencies of choice. It so happens that routine biopsy will reveal squamous cell nests in about ten percent of all rodent ulcers. Squamous epithelioma is more resistant to radium and x-ray than basal celled carcinoma. We have not infrequently encountered deep seated cancer in the head and neck, which had resisted prior treatment by radium and x-ray—for a clinically typical basal-celled epithelioma. The histologic pattern in these grievous type cases is occasionally basal squamous epithelioma, or other mixed cell type of growth. It is for this reason that we advocate initial electrosurgical biopsy on all accessible neoplasms, whether the oncologist plans to use radiation as the main agency or not. As already stated, initially employed electrosurgical excisional biopsy is curative in almost every case of basal celled cancer. The method is very effective for lesions about the face, nose, nasolacrymal duct and eyelids.

A rare form of basal cancer, the metastasizing basal celled carcinoma, is occasionally seen. We have two such cases in our collection. Metastasis had already occurred when the patient was first seen. Despite electrosurgical resection of the primary lesion, and vigorous postoperative x-ray treatment, both patients died from distant metastases.

2. *Squamous cell Carcinoma.* (Epithelioma spino-cellulare. Epidermoid cancer.) Variably malignant, and variably radiosensitive. More apt to metastasize than basal celled cancer. Low grade squamous celled cancer is found in the lip, buccal and lingual mucosa, about the face, scalp and auricle, in the skin of the trunk and extremities, on the external genitals and within the anal canal. Low grade epidermoid cancer is rather radioresistant. When attacked in its early localized stage it is amenable to cure by electrosurgical excisional biopsy. High grade epidermoid cancer may develop in the above locations and also in the floor of the mouth, back of the tongue and in the cervix uteri. High grade cancer especially in these locations is best treated by radiation. Electrosurgical biopsy may be conveniently employed as the preliminary step in diagnosis

and as a means of preparation for radium application. Squamous celled cancer of the external genitals is a dangerous disease. Cancer of the vulva is highly radioresistant. Electrosurgical resection under general anesthesia together with dissection of the groin is the method of choice.

3. *Melanoma.* (Melano-carcinoma; melanotic sarcoma.) This highly fatal type of skin cancer may be prevented if the physician will "beware the blue black mole" and employ electrosurgical excisional biopsy upon the growth during its incipiency. Pigmented growths are radioresistant. Nothing short of wide excision should be done in the removal of these dangerous new growths.

4. *Adenocarcinoma.* Mammary cancer is a major type lesion. Office management is best limited to physical examination, transillumination, radiography, preoperative and postoperative radiation. Our case records on electrosurgical excisional biopsy show very few patients with adenocarcinoma. They were distributed as follows: adenocarcinoma of the sweat glands, of the soft palate, and of the vulva.

Selection of cases for management by Electrosurgical Excisional Biopsy

The following points may be briefly emphasized:

1. Careful history. "Ten Golden Rules of Cancer Examination."[1]

2. Clinical appraisal should indicate low grade lesion, accessible for electrosurgical resection under local anesthesia.

3. Facilities should be available for biopsy and, depending upon the histologic findings, for subsequent hospitalization, further surgery or

radiation, if and when indicated.

4. Evaluation of constitutional factors. Secondary infection and syphilis are important complications, especially the latter. Advanced age is seldom a contraindication per se. The senile victim of cancer cooperates well and the growth is usually slow growing and of low grade malignancy. He should not be denied the opportunity of cure through mistaken kindness or incorrect appraisal of his expectancy. Excellent results follow prompt electrosurgical extirpation of readily accessible cancer in the aged.

Technic of Management

(As employed in office and outpatient clinic)

Cooperative teamwork between operator, pathologist and radiologist is important. Electrosurgical excisional biopsy provides data of importance to each of the three. In those cases wherein the method is of itself insufficient to cure, the method may be adapted to the requirements of the particular problem at hand. Electrosurgery is not recommended as a substitute for either classic surgery or radiation. Electrosurgical excisional biopsy requires special equipment and attention to technic.

Preoperative sedation, preparation of the operative field and sterilization of instruments as for any aseptic operation. Gloves may be dispensed with in the minor lesions, since the operative instrument sterilizes as it cuts and fingers are never inserted into the wound. Ligatures and sutures are seldom required.

Anesthesia by nerve block or local anesthetic

should be invariably employed, and should be better than for ordinary surgery. The incision is made by a very fine pointed bistoury activated with the "cutting current" from a modern spark-gap electrosurgical unit. The line of incision should be well beyond the grossly visible and palpable margin of the growth. The neoplasm is then resected *in toto* along with the underlying tumor bed. The electric arc will easily follow the proper line of cleavage, if the operator is careful to work well beyond the obviously neoplastic growth. Spurting vessels are controlled by hemostat, and sealed by the application of the "coagulating current" which is also available in the modern electrosurgical unit. The base of the wound is then lightly dessicated, to stop capillary oozing, close lymph spaces and cover the terminals of the sensory nerves. The wound may be closed by sutures. In most cases this is neither necessary nor advisable. The wound is kept clean and watched for evidences of continued growth. Follow up biopsies are done if any suspicious nodule appears in the wound. Radium application may be employed when indicated. As a rule, ordinary dressings reinforced by the occasional radiation with a cold quartz mercury vapor uviarc result in complete and satisfactory wound healing. It is true that electrosurgical wounds may require a longer time for wound healing than after scalpel excision. In large benign tumors this factor is important. In the treatment of cancer, however, the advantages of electrosurgical excisional biopsy are such that the additional time factor is of relatively less importance.